

√ - Saline Control

N PGF- $2\alpha - 1$ hr 10 mM sperm.

 ω PFG-2 $\alpha-1$ hr 10 mM sperm. + 5 hr 1 mM sperm.



 σ PGF-2α (1 h 35 m) + Spermidine σ PGF-2 α (3 h 45 m) + Spermidine A PGF-2 α (1 h 35 m) + Spermidine $_{\rm L}$ PGF-2 $_{\rm M}$ (3 h 45 m) + Spermidine N Control + Spermidine N ω PGF-2α (1 h 35 m) Control

FIG.2



S K T G K H G H A K V H L V G I D I F T G K K Y GAAGATATCTGCCCGTCGACTCATAACATGGATGTCCCCAACATCAAAAGGAATGATTTCCAGCTGATTGGC E D I C P S T H N M D V P N I K R N D F Q L I G ATCCAGGATGGGTACCTATCCCTGCTCCAGGACAGTGGGGAGGTACGAGAGGACCTTCGTCTGCCTGAGGGA I Q D G Y L S L L Q D S G E V R E D L R L P E G GACCTTGGCAAGGAGATTGAGCAGAAGTATGACTGTGGAGAAGAGATCCTGATCACAGTGCTGTCCGCCATG D L G K E I E O K Y D C G E E I L I T V L S A M ACAGAGGAGGCAGCTGTTGCAATCAAGGCCATGGCAAAAT**AA**CTGGCTTCCAGGGTGGCGGTGGTGGCAGCA TEEAAVAIKAMAK TTTGACGTTTTATTTTGGTTTTCCTCACCCCTTCAAACTGTCGGGGAGACCCTGCCCTTCACCTAGCTCCCT TGGCCAGGCATGAGGGAGCCATGGCCTTGGTGAAGCTACCTGCCTCTTCTCTCGCAGCCCTGATGGGGGAAA GGGAGTGGGTACTGCCTGTGGTTTAGGTTCCCCTCTCCCTTTTTCTTTTTAATTCAATTTGGAATCAGAAAG CTGTGGATTCTGGCAAATGGTCTTGTGTCCTTTATCCCACTCAAACCCATCTGGTCCCCTGTTCTCCATAGT TCTATAGGGGTGACAAGAAGAGGGGGGGGGGGGGGGGCACCCTCCTCAGGCATCTGGGAAGGCCTTGC CCCCATGGGCTTTACCCTTTCCTGTGGGCTTTCTCCCTGACACATTTGTTAAAAATCAAACCTGAATAAAAC TACAAGTTTAATATGAAAAAAAAAAAAAAAAAAAAAAA (972 NT. 109 aa)

FIG.3



(488 NT, 151 aa)



CAGGTCTAGAGTTGGAATCGAAGCCTCTTAAAATGGCAGATGATTTGGACTTCGAGACAGGAGATGCAGGGG	
M A D D L D F E T G D A G	13
CCTCAGCCACCTTCCCAATGCAGTGCTCAGCATTACGTAAGAATGGTTTTTGTGGTGCTCAAGGGCCGGCC	144
A S A T F P M Q C S A L R K N G F V V L K G R P	
GTAAGATCGTCGAGATGTCTACTTCGAAGACTGGCAAGCATGCCAAGGTCCATCTGGTTGGT	
C K I V E M S T S K T G K H G H A K V H L V G I	61
ATATTTTTACTGGGAAGAAATATGAAGATATCTGCCCGTCGACTCATAACATGGATGTCCCCAACATCAAAA	288
DIFTGKKYEDICPSTHNMDVPNIK	
GGAATGATTTCCAGCTGATTGGCATCCAGGATGGGTACCTATCCCTGCTCCAGGACAGTGGGGAGGTACGAG	
RNDFQLIGIQDGYLSLLQDSGEVR	109
AGGACCTTCGTCTGCCTGAGGGAGACCTTGGCAAGGAGATTGAGCAGAAGTATGACTGTGGAGAAGATCC	432
E D L R L P E G D L G K E I E Q K Y D C G E E I	
TGATCACAGTGCTGTCCGCCATGACAGAGGAGGCAGCTGTTGCAATCAAGGCCATGGCAAAAT AA CTGGCTT	
LITVLSAMTEEAAVAIKAMAK*	154
CCAGGGTGGCGGTGGCAGCAGTGATCCATGAGCCTACAGAGGCCCCTCCCCCAGCTCTGGCTGG	576
TGGCTGGACTCCTATCCAATTTATTTGACGTTTTATTTTGGTTTTCCTCACCCCTTCAAACTGTCGGGGAGA	
CCCTGCCCTTCACCTAGCTCCCTTGGCCAGGCATGAGGGAGCCATGGCCTTGGTGAAGCTACCTGCCTCTTC	720
TCTCGCAGCCCTGATGGGGGAAAGGGAGTGGGTACTGCCTGTGGTTTAGGTTCCCCTCTCCCTTTTTCTTTT	
TAATTCAATTTGGAATCAGAAAGCTGTGGATTCTGGCAAATGGTCTTGTGTCCTTTATCCCACTCAAACCCA	864
TCTGGTCCCCTGTTCTCCATAGTCCTTCACCCCCAAGCACCACTGACAGACTGGGGACCAGCCCCCTTCCCT	
GCCTGTGTCTCTCCCAAACCCCTCTATAGGGGTGACAAGAAGAGGGGGGGG	1008
TCAGGCATCTGGGAAGGCCTTGCCCCCATGGGCTTTACCCTTTCCTGTGGGCTTTCTCCCTGACACATTTGT	
TAAAAATCAAACCTGAATAAAACTACAAGTTTAATATGAAAAAAAA	1139

(1139 NT, 154 aa)

FIG.5

rat vs. human(BC000751 or NM 001970) 96.5% identity (coding)

rat v	s. human(BC000751	or NM_0019	970) 96.5%	identity	(coding)	
rat	10 ATGGCAGATGATTTGG/ :::::::::::::::::::::::::::::::::	::::::::	::::::::	:::::::::	:::::::::	::::
riumari	10	20	30	40 40	50	60
rat	70 CAGTGCTCAGCATTACO	80 GTAAGAATGG	90 FTTTGTGGTG	100 CTCAAGGGCC	110 GGCCATGTAA	120 GATC
human	CAGTGCTCAGCATTACO 70	GTAAGAATGG(80	CTTTGTGGTG 90		GGCCATGTAA	GATC 120
rat	130 GTCGAGATGTCTACTTC	140 CGAAGACTGG	150 CAAGCATGGC	160 CATGCCAAGG	170 FCCATCTGGT	180 TGGT
human	GTCGAGATGTCTACTTC 130	CGAAGACTGG(140	CAAGCACGGC 150	ACGCCAAGG	TCCATCTGGT 170	TGGT 180
rat	190 ATTGATATTTTTACTGO	200 GGAAGAAATA	210 FGAAGATATC	220 TGCCCGTCGA		
human	ATTGACATCTTTACTGO	GAAGAAATA 200	TGAAGATATC 210	rgcccgtcaa 220		:::: GGAT 240
rat	250 GTCCCCAACATCAAAA	260 GGAATGATTT(270 CCAGCTGATT	280 GGCATCCAGG	290 ATGGGTACCT	300 ATCC
human	GTCCCCAACATCAAAA(250	GGAATGACTT(260	CCAGCTGATT 270	GGCATCCAGG/ 280	ATGGGTACCT 290	::: ATCA 300
rat	310 CTGCTCCAGGACAGTG	320 GGAGGTACG/	330 AGAGGACCTT	340 CGTCTGCCTG/	350 AGGGAGACCT	360 TGGC
human	CTGCTCCAGGACAGCGC	GGAGGTACG/ 320	::::::: AGAGGACCTT(330		AGGGAGACCT 350	: : : : TGGC 360
rat	370 AAGGAGATTGAGCAGAA	380 AGTATGACTG	390 rggagaagag	400 ATCCTGATCA	410 CAGTGCTGTC	
human	AAGGAGATTGAGCAGA/ 370	AGTACGACTG 380	TGGAGAAGAG/ 390	ATCCTGATCA(400	CGGTGCTGTC 410	::: TGCC 420
rat	430 ATGACAGAGGAGGCAG	440 CTGTTGCAATO	450 CAAGGCCATG	460 GCAAAA		
human	ATGACAGAGGAGGCAGC 430 440 450		:::::::: CAAGGCCATG(::::: GCAAAA		



rat vs. $human(NM_020390)$ 72.5% identity (coding)

	10	20	30	40	50	60
rat	ATGGCAGATGATTT	GGACTTCGAG	ACAGGAGATO	CAGGGGCCT(CAGCCACCTT	CCCAATG
human	ATGGCAGACGAAAT	: :: ::: TGATTTCACT	:::::: ACTGGAGATA	: :::::::	: ::::: `^^&G^^A^TT&!	
Hamari	10	20	30	40	50	60
rat	70 CAGTGCTCAGCATT	80	90	100	110	120
iat	CAGIGCICAGCAII	ACGIAAGAAI	:: :: ::::	::::::::	: :: :::::	:: ::
human	CAGTGCTCGGCCTT	GCGCAAAAAC		GTGCTCAAAG	GACGACCATG	CAAAATA
	70	80	90	100	110	120
	130	140	150	160	170	180
rat	GTCGAGATGTCTAC	TTCGAAGACT	GGCAAGCATG	GCCATGCCA	AGGTCCATCT	GGTTGGT
human	GTGGAGATGTCAAC	TTCCAAAACT	GGAAAGCATO	GTCATGCCA	::::::::::::::::::::::::::::::::::::::	TGTTGGA
	130	140	150	160	170	180
	190	200	210	220	230	240
rat				_	230 CGACTCATAA	
		:: :: :::	::::::::::::		: :::::	:::::::
human	ATTGATATTTTCAC					
	190	200	210	220	230	240
	250	260	270	280	290	300
rat	250 GTCCCCAACATCAA					
	GTCCCCAACATCAA	AAGGAATGAT	TTCCAGCTGA	ATTGGCATCC	AGGATGGGTA	CCTATCC
rat human	GTCCCCAACATCAA :: :: :: :: :: GTTCCAAATATTAA	AAGGAATGAT :::::::: GAGAAATGAT	TTCCAGCTGA : ::::: TATCAACTGA	ATTGGCATCC :::::::: ATATGCATTC	AGGATGGGTA : ::::: AAGATGGTTA	CCTATCC ::: ::: CCTTTCC
	GTCCCCAACATCAA	AAGGAATGAT	TTCCAGCTGA	ATTGGCATCC	AGGATGGGTA	CCTATCC
human	GTCCCCAACATCAA :: :: :: :: :: GTTCCAAATATTAA 250 310	AAGGAATGAT :: :::::: GAGAAATGAT 260 320	TTCCAGCTGA : :: :::: TATCAACTGA 270 330	ATTGGCATCC ATATGCATTC 280 340	AGGATGGGTA : ::::: :: AAGATGGTTA 290 350	CCTATCC :::::::: CCTTTCC 300 360
	GTCCCCAACATCAA :: :: :: :: :: GTTCCAAATATTAA 250	AAGGAATGAT :: :::::: GAGAAATGAT 260 320	TTCCAGCTGA : :: :::: TATCAACTGA 270 330	ATTGGCATCC ATATGCATTC 280 340	AGGATGGGTA : ::::: :: AAGATGGTTA 290	CCTATCC :::::::: CCTTTCC 300 360
human rat	GTCCCCAACATCAA ::::::::::::::::::::::::::	AAGGAATGAT ::::::: GAGAAATGAT 260 320 TGGGGAGGTA	TTCCAGCTGA : :::::: TATCAACTGA 270 330 CGAGAGGACC	ATTGGCATCC ATATGCATTC 280 340 CTTCGTCTGC	AGGATGGGTA : ::::: :: AAGATGGTTA 290 350 CTGAGGGAGA : :: :: ::	CCTATCC ::::::: CCTTTCC 300 360 CCTTGGC :::::
human	GTCCCCAACATCAA :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG :::: :: ::	AAGGAATGAT ::::::: GAGAAATGAT 260 320 TGGGGAGGTA	TTCCAGCTGA : :::::: TATCAACTGA 270 330 CGAGAGGACC	ATTGGCATCC ATATGCATTC 280 340 CTTCGTCTGC	AGGATGGGTA : ::::: :: AAGATGGTTA 290 350 CTGAGGGAGA : :: :: ::	CCTATCC ::::::: CCTTTCC 300 360 CCTTGGC :::::
human rat	GTCCCCAACATCAA :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG :::: :: :: CTGCTGACAGAAAC 310	AAGGAATGAT :::::::: GAGAAATGAT 260 320 TGGGGAAGGTA ::::::: TGGTGAAGTT 320	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGGACC :: ::::::: CGTGAGGATC 330	ATTGGCATCC 280 340 CTTCGTCTGC 211 211 211 211 211 211 211 21	AGGATGGGTA : :::::::: AAGATGGTTA 290 350 CTGAGGGAGA : : : ::: CAGAAGGTGA 350	CCTATCC ::::::: CCTTTCC 300 360 CCTTGGC ::::: ACTAGGC 360
human rat human	GTCCCCAACATCAA :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG ::::: :: CTGCTGACAGAAAC 310 370	AAGGAATGAT ::::::: GAGAAATGAT 260 320 TGGGGAGGTA :::::: TGGTGAAGTT 320 380	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGGACC :: ::::::: CGTGAGGGATC 330 390	ATTGGCATCC 280 340 CTTCGTCTGC 211 CTTAAACTGC 340 400	AGGATGGGTA : ::::::::: AAGATGGTTA 290 350 CTGAGGGAGA : :: :::: CAGAAGGTGA 350 410	360 CCTTGGC ::::::: 300 CCTTGGC :::::: ACTAGGC 360 420
human rat human	GTCCCCAACATCAA :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG :::: :: :: CTGCTGACAGAAAC 310	AAGGAATGAT ::::::: GAGAAATGAT 260 320 TGGGGAGGTA :::::: TGGTGAAGTT 320 380	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGGACC :: ::::::: CGTGAGGGATC 330 390	ATTGGCATCC 280 340 CTTCGTCTGC 2::::::: CTTAAACTGC 340 400 GAGATCCTGA	AGGATGGGTA : ::::::::: AAGATGGTTA 290 350 CTGAGGGAGA : :: :::: CAGAAGGTGA 350 410	360 CCTTGGC ::::::: 300 CCTTGGC :::::: ACTAGGC 360 420
human rat human rat	GTCCCCAACATCAA :: :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG :::: :: :: CTGCTGACAGAAAC 310 370 AAGGAGATTGAGCA	AAGGAATGAT :::::::: GAGAAATGAT 260 320 TGGGGAAGGTA ::::::: TGGTGAAGTT 320 380 GAAGTATGAC ::::::	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGGACC :: ::::: CGTGAGGATC 330 390 TGTGGGAGAGACC	ATTGGCATCC 280 340 CTTCGTCTGCC 340 CTTAAACTGCC 340 400 AGATCCTGACCC AGATCCTGACCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	AGGATGGGTA : :::::::: AAGATGGTTA 290 350 CTGAGGGAGA : : ::::: CAGAAGGTGA 350 410 TCACAGTGCT : : ::::	CCTATCC ::::::: CCTTTCC 300 360 CCTTGGC ::::: ACTAGGC 360 420 GTCCGCC ::::: GTGTGCA
human rat human rat	GTCCCCAACATCAA :: :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG :::: :: :: CTGCTGACAGAAAC 310 370 AAGGAGATTGAGCA	AAGGAATGAT :::::::: GAGAAATGAT 260 320 TGGGGGAGGTA :::::::: TGGTGAAGTT 320 380 GAAGTATGAC	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGGGACC :: :::::: CGTGAGGGATC 330 390 TGTGGGAGAGAACC	ATTGGCATCC 280 340 CTTCGTCTGC 340 CTTAAACTGC 340 400 GAGATCCTGA	AGGATGGGTA : :::::::: AAGATGGTTA 290 350 CTGAGGGAGA : ::::::: CAGAAGGTGA 350 410 TCACAGTGCT	CCTATCC ::::::: CCTTTCC 300 360 CCTTGGC ::::: ACTAGGC 360 420 GTCCGCC :::::
human rat human rat	GTCCCCAACATCAA :: :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG :::: :: :: CTGCTGACAGAAAC 310 370 AAGGAGATTGAGCA :: :: :: :: AAAGAAATAGAGGG 370	AAGGAATGAT :::::::: GAGAAATGAT 260 320 TGGGGAAGGTA ::::::: TGGTGAAGTT 320 380 GAAGTATGAC ::::: AAAATACAAT	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGAGGACC :: :::::: CGTGAGGGATC 330 390 TGTGGGAGAACC :: ::::: GCAGGTGAACC	ATTGGCATCC 280 340 CTTCGTCTGCC 340 ATTAAACTGCC 340 400 AGAGATCCTGAC 340 400 AGAGATCCTGAC 340	AGGATGGGTA : :::::::: AAGATGGTTA 290 350 CTGAGGGAGA : : ::::: CAGAAGGTGA 350 410 TCACAGTGCT : : ::::	CCTATCC ::::::: CCTTTCC 300 360 CCTTGGC ::::: ACTAGGC 360 420 GTCCGCC ::::: GTGTGCA
human rat human rat	GTCCCCAACATCAA :: :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG :::: :: :: CTGCTGACAGAAAC 310 370 AAGGAGATTGAGCA :: :: :: :: AAAGAAATAGAGGG	AAGGAATGAT :::::::: GAGAAATGAT 260 320 TGGGGGAGGTA ::::::: TGGTGAAGTT 320 380 GAAGTATGAC :::::: AAAATACAAT 380 440	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGGGACC :: ::::: CGTGAGGATC 330 390 TGTGGGAGAAC 390 450	ATTGGCATCC 280 340 CTTCGTCTGC 340 ATTAAACTGC 340 400 AGATCCTGA EATGTACAGG 400 460	AGGATGGGTA : :::::::: AAGATGGTTA 290 350 CTGAGGGAGA : : ::::: CAGAAGGTGA 350 410 TCACAGTGCT : : ::::	CCTATCC ::::::: CCTTTCC 300 360 CCTTGGC ::::: ACTAGGC 360 420 GTCCGCC ::::: GTGTGCA
human rat human rat	GTCCCCAACATCAA ::::::::::::::::::::::::::	AAGGAATGAT :::::::: GAGAAATGAT 260 320 TGGGGGAGGTA ::::::: TGGTGAAGTT 320 380 GAAGTATGAC ::::::: AAAATACAAT 380 440 AGCTGTTGCA	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGAGGACC :: ::::: CGTGAGGGATC 330 390 TGTGGGAGAGACC GCAGGTGAACC 390 450 ATCAAGGCCA	ATTGGCATCC 280 340 CTTCGTCTGCC 340 CTTAAACTGCC 340 400 AGATCCTGAC 400 AGATCCTGAC 400 460 ATGGCAAAA 	AGGATGGGTA : :::::::: AAGATGGTTA 290 350 CTGAGGGAGA : : ::::: CAGAAGGTGA 350 410 TCACAGTGCT : : ::::	CCTATCC :::::::: CCTTTCC 300 360 CCTTGGC ::::: ACTAGGC 360 420 GTCCGCC ::::: GTGTGCA
human rat human rat	GTCCCCAACATCAA :: :: :: :: :: :: GTTCCAAATATTAA 250 310 CTGCTCCAGGACAG :::: :: :: CTGCTGACAGAAAC 310 370 AAGGAGATTGAGCA :: :: :: :: AAAGAAATAGAGGG 370 430	AAGGAATGAT :::::::: GAGAAATGAT 260 320 TGGGGGAGGTA ::::::: TGGTGAAGTT 320 380 GAAGTATGAC ::::::: AAAATACAAT 380 440 AGCTGTTGCA	TTCCAGCTGA : :: :::: TATCAACTGA 270 330 CGAGAGAGGACC :: ::::: CGTGAGGGATC 330 390 TGTGGGAGAGACC GCAGGTGAACC 390 450 ATCAAGGCCA	ATTGGCATCC 280 340 CTTCGTCTGCC 340 CTTAAACTGCC 340 400 AGATCCTGAC 400 AGATCCTGAC 400 460 ATGGCAAAA 	AGGATGGGTA : :::::::: AAGATGGTTA 290 350 CTGAGGGAGA : : ::::: CAGAAGGTGA 350 410 TCACAGTGCT : : ::::	CCTATCC :::::::: CCTTTCC 300 360 CCTTGGC ::::: ACTAGGC 360 420 GTCCGCC ::::: GTGTGCA



rat vs. mouse (BC003889) 98.3% identity (coding)

rat	10	20	30	40	50	60
	ATGGCAGATGATTTGG	ACTTCGAGAC	AGGAGATGCA	GGGGCCTCAG	CCACCTTCCC	AATG
mouse	ATGGCAGATGATTTGG	ACTTCGAGAC 20	AGGAGATGCA 30	GGGGCCTCAG 40	CCACCTTCCC 50	AATG 60
rat	70 CAGTGCTCAGCATTAC	80 GTAAGAATGG ::::::::	90 TTTTGTGGTG	100 CTCAAGGGCC	110 GGCCATGTAA	120 GATC
mouse	CAGTGCTCAGCATTAC	GTAAGAATGG	TTTTGTGGTG	CTCAAAGGCC	GGCCATGTAA(GATC
	70	80	90	100	110	120
rat	130	140	150	160	170	180
	GTCGAGATGTCTACTT	CGAAGACTGG	CAAGCATGGC	CATGCCAAGG	FCCATCTGGT	TGGT
mouse	GTCGAGATGTCTACTT	CGAAGACTGG	CAAGCATGGC	CATGCCAAGG	TCCATCTGGT	TGGC
	130	140	150	160	170	180
rat	190	200	210	220	230	240
	ATTGATATTTTTACTG	GGAAGAAATA	TGAAGATATC	TGCCCGTCGA	CTCATAACAT	GGAT
mouse	ATTGACATTTTTACTG	GGAAGAAATA	TGAAGATATC	TGCCCGTCGA(CTCATAATAT(GGAT
	190	200	210	220	230	240
rat	250	260	270	280	290	300
	GTCCCCAACATCAAAA	GGAATGATTT(CCAGCTGATT	GGCATCCAGG/	ATGGGTACCT	ATCC
mouse	GTCCCCAACATCAAAC	GGAATGACTT	CCAGCTGATT	GGCATCCAGG/	ATGGGTACCT/	ATCC
	250	260	270	280	290	300
rat	310	320	330	340	350	360
	CTGCTCCAGGACAGTG	GGGAGGTACG	AGAGGACCTT	CGTCTGCCTG	AGGGAGACCT	FGGC
mouse	CTGCTCCAGGACAGTG	GGGAGGTACG/	AGAGGACCTT	CGTCTGCCTG/	AAGGAGACCT	TGGC
	310	320	330	340	350	360
rat	370	380	390	400	410	420
	AAGGAGATTGAGCAGA	AGTATGACTG	TGGAGAAGAG	ATCCTGATCA	CAGTGCTGTC	CGCC
mouse	AAGGAGATTGAGCAGA 370	AGTATGACTG 380	: : : : : : : : : : : : : : : : : : :	::::::: ATCCTGATCA(400	CAGTGCTGTCT 410	::: ГGCC 420
rat	430 ATGACAGAGGAGGCAG	440 CTGTTGCAAT(450 CAAGGCCATG	460 GCAAAA		
mouse	ATGACAGAGGAGGCAG	:::::::: CTGTTGCAAT(440	:::::::: CAAGGCCATG(450	::::: GCAAAA 460		



rat vs. human(BC000751 or NM_001970) 100.0% identity MADDLDFETGDAGASATFPMQCSALRKNGFVVLKGRPCKIVEMSTSKTGKHGHAKVHLVG rat human MADDLDFETGDAGASATFPMQCSALRKNGFVVLKGRPCKIVEMSTSKTGKHGHAKVHLVG IDIFTGKKYEDICPSTHNMDVPNIKRNDFQLIGIQDGYLSLLQDSGEVREDLRLPEGDLG rat $human \ \ IDIFTGKKYEDICPSTHNMDVPNIKRNDFQLIGIQDGYLSLLQDSGEVREDLRLPEGDLG$ KEIEQKYDCGEEILITVLSAMTEEAAVAIKAMAK rat human KEIEQKYDCGEEILITVLSAMTEEAAVAIKAMAK

FIG.9



rat vs. human(NM_020390) 82.5% identity rat MADDLDFETGDAGASATFPMQCSALRKNGFVVLKGRPCKIVEMSTSKTGKHGHAKVHLVG human MADEIDFTTGDAGASSTYPMQCSALRKNGFVVLKGRPCKIVEMSTSKTGKHGHAKVHLVG IDIFTGKKYEDICPSTHNMDVPNIKRNDFQLIGIQDGYLSLLQDSGEVREDLRLPEGDLG rat human IDIFTGKKYEDICPSTHNMDVPNIKRNDYQLICIQDGYLSLLTETGEVREDLKLPEGELG KEIEQKYDCGEEILITVLSAMTEEAAVAIKAMAK rat human KEIEGKYNAGEDVQVSVMCAMSEEYAVAIKP-CK



rat vs. mouse (BC003889)100.0% identity rat MADDLDFETGDAGASATFPMQCSALRKNGFVVLKGRPCKIVEMSTSKTGKHGHAKVHLVG mouse MADDLDFETGDAGASATFPMQCSALRKNGFVVLKGRPCKIVEMSTSKTGKHGHAKVHLVG rat IDIFTGKKYEDICPSTHNMDVPNIKRNDFQLIGIQDGYLSLLQDSGEVREDLRLPEGDLG mouse IDIFTGKKYEDICPSTHNMDVPNIKRNDFQLIGIQDGYLSLLQDSGEVREDLRLPEGDLG rat KEIEQKYDCGEEILITVLSAMTEEAAVAIKAMAK mouse KEIEQKYDCGEEILITVLSAMTEEAAVAIKAMAK



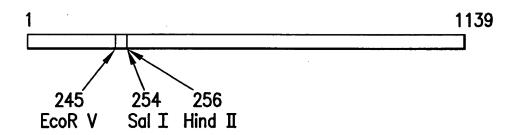


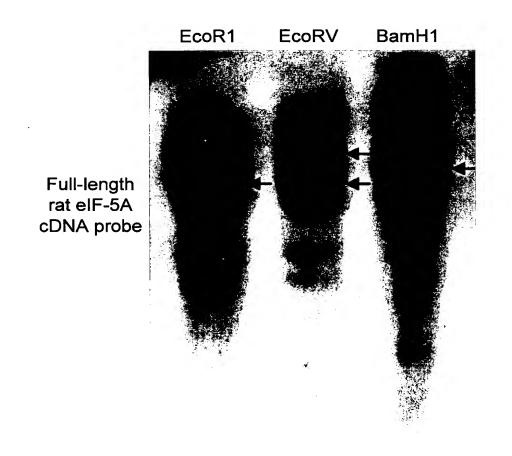
FIG.12



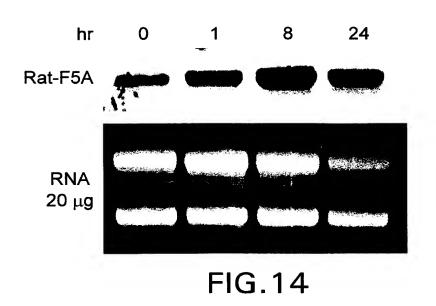
SOUTHERN BLOT OF RAT GENOMIC DNA

EcoR V

Rat eIF-5A 1139 bp









GCTGTGTATTATTGGGCCCATAAGAACCACATACCTGTGCTGAGTCCTGCACTCACAGACGGCTCACTGGGT AVYYWAHKNHIPVLSPALTDGSLG GACATGATCTTTTCCATTCCTATAAAAACCCAGGCTTGGTCCTGGACATCGTTGAAGACCTGCGGCTCATC D M I F F H S Y K N P G L V L D I V E D L R L I AACATGCAGGCCATTTTCGCCAAGCGCACTGGGATGATCATCCTGGGTGGAGGCGTGGTCAAGCACCACATC NMQAIFAKRTGMIILGGGVVKHHI GCCAATGCTAACCTCATGCGGAATGGAGCTGACTACGCTGTTTATATCAACACAGCCCAGGAGTTTGATGGC A N A N L M R N G A D Y A V Y I N T A Q E F D G S D S G A R P D E A V S W G K I R M D A Q P V K GTCTATGCTGATGCATCTCTGGTTTTCCCCTTGCTGGTGGCTGAGACATTCGCCCAAAAGGCAGATGCCTTC V Y A D A S L V F P L L V A E T F A Q K A D A F RAEKNED GCATACCAACCCCTCCTGGGCCCTCTCCTTGGTCAGCAGCATCTTGAGAATAAATGGCCTTTTTGTTGGTTT CTGTAAAAAAAGGACTTTAAAAAAAAAAAA

(606 NT, 151 aa)



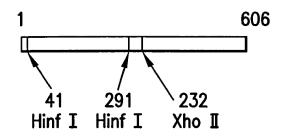
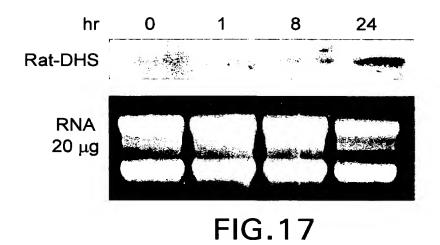


FIG.16







rat vs. human (BC000333) 87.4% identity (coding)

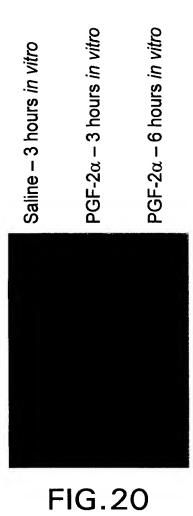
			•			
	10	20	30	40	50	60
rat	GCTGTGTATTAT	TGGGCCCATAAG	SAACCACATAC	CTGTGCTGAC	STCCTGCACTO	CACAGAC
	: :::::::	:::::::::::::::::::::::::::::::::::::::				::::::
human	TCCGTGTATTAC					
	10	20	30	40	50	60
	70	80	90	100	110	120
rat	GGCTCACTGGGT					
				: :: :::::	: ::: :::::	::::::
human						
	70	80	90	100	110	120
	130	140	150	160	170	180
rat	ATCGTTGAAGAC					
. 40		::: ::::::::	::::: ::::			::::::
human	ATCGTTGAGGAC	CTGAGGCTCATC	CAACACACAGG	CCATCTTTG	CAAGTGCACT	GGGATG
	130	140	150	160	170	180
	400	222	010	000		0.40
na+	190 ATCATCCTGGGT	200	210	220	230	240
rat	ATCATCCTGGGT		,AAGUAUUAUA	AICGCCAAIGC	HAACCICAIC	CGGAAI
human	ATCATTCTGGGC	GGGGGCGTGGTC	AAGCACCACA	TTGCCAATGC	CAACCTCAT	GCGGAAC
	190	200	210	220	230	240
-	250	260	270	280	290	300
rat	GGAGCTGACTAC	GCTGTTTATATC	CAACACAGCCC	CAGGAGTTTGA	ATGGCTCAGAC	CTCAGGA
human	GGGGCCGACTAC	CCTCTTTACATO	::::::::::::::::::::::::::::::::::::::	CACCACTTTC	TCCCTCTCA(TC ACCT
Hullian	250	260	270	280	290	300
	250	200	270	200	230	300
	310	320	330	340	350	360
rat	GCCCGGCCAGAT	GAGGCTGTCTCC	TGGGGCAAGA	ATCCGGATGG/	ATGCACAGCCA	AGTAAAG
	:::::::::::::::::::::::::::::::::::::::	:::::::::::::::::::::::::::::::::::::::				:: :::
human	GCCCGACCAGAC					
	310	320	330	340	350	360
	370	380	390	400	410	420
rat	GTCTATGCTGAT					
	::::::::::	:: :: :::::		:: ::::::::	: :: :: :::	::::::
human	GTCTATGCTGAC					
	370	380	390	400	410	420
	420	440	450			
rat	430 GCAGATGCCTTC	440 AGAGCTGAGAA	450 SAATGAGGAC			
Iac	GCAGATGCCTTC		:: ::::::			
human	ATGGATGCCTTC					
	430	440	450			





FIG.19







Southern Blot of Rat Genomic DNA EcoRV

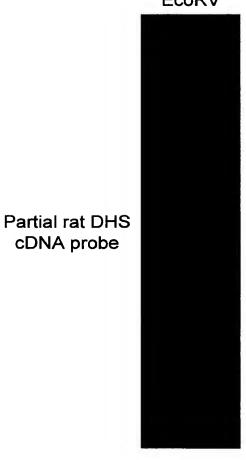


FIG.21